

# Cold and Quiet at Angels 16

By Ltjg. Nate Lyon

I was a nugget on my first month of deployment, and I was probably one of the few pilots excited to go flying in the prevailing weather conditions: icing, snow, freezing rain, and low overcast. The poor weather forced the cancellation of the first three events of the day, but conditions had improved for us to launch on a large-force strike as part of the Foal Eagle 2006 exercise. I was Dash 2 in a section of strikers tasked to deliver simulated laser-guided weapons on a target located in a range complex.

My lead's aircraft went down before launch, and I subsequently became a single ship—alone and unafraid. Once airborne, my first task was to penetrate 16,000 feet of clouds in potential icing conditions and climb overhead to get gas from an Air Force KC-135. Having only tanked a few times on the Iron Maiden in my short career, I looked forward to getting that task out of the way, so I could focus on the mission at hand. Once on top of the clouds, I found the tanker, got into the basket, and almost was topped off when my aircraft began to exhibit several unusual indications.

The first problem was a master-caution light, with an associated master-caution aural tone. An occasional electrical hiccup, with the associated momentary cautions, is not unusual in the Hornet. Although things were going smoothly on the tanker, I initially thought I might have damaged an AOA probe while receiving gas. But, almost as quickly as the master caution had appeared, it went away. I subsequently chalked up the event to “stray trons.”

Five minutes later, as I began to separate from the KC-135's fuel hose, the master-caution light illuminated once again. This time, however, all of the aircraft's displays, including the heads-up display (HUD), which

is our primary attitude indicator, flashed briefly. Once again, though, electrical power was returned almost immediately. I did, however, make a mental note of what had occurred as I detached from the tanker and shifted my focus toward navigating the unfamiliar foreign airspace.

A short time later, the jet told me once and for all it had not simply been crying wolf. This time, every cockpit display again disappeared. I found myself referencing the backup steam gauges for the first time since an early instrument simulator in the FRS. Also, the power to both radios and to the up-front-control, the keypad through which most communication and navigation functions are accessed, had been lost. The issue that most concerned me at the time, however, was the temperature in the cockpit: It had become extremely cold in a matter of seconds. I did everything I could think of to heat up the cockpit, but I couldn't change the inside temperature.

As I struggled to regain heat, I noticed that the jet also had an RGEN (right generator offline) caution and a GEN TIE caution. These two cautions meant the right generator had dropped offline, and the left generator had not accepted the load. The FA-18 electrical system is designed to maintain full functionality in the event of a single generator failure by automatically shifting electrical power from one generator to the other. In this instance, the system had failed.

Fortunately, two of my five cockpit displays returned shortly after they had been lost. I was able to display the HUD on my left digital indicator and began to use it again as my primary attitude reference. I noticed the HUD was missing key pitot-static information, and I had lost the air-data computer. The TACAN



I found the tanker, got into the basket, and almost was topped off when my aircraft began to exhibit several unusual indications.

had dropped offline, which limited my options for navigating back to the ship in IMC. The severity of the situation began to sink in. I was a single at 16,000 feet, on top of an undercast, with known icing conditions, unable to see the ship, NORDO, and with a rapidly decreasing cabin temperature.

I figured I had experienced a generator malfunction, but there was some disparity between the indications I had and those listed in the NATOPS pocket checklist (PCL) for a right generator failure with the bus tie open. For example, the loss of both radios was not on the list. I should have retained COMM 1 with backup battery power. I later found out this malfunction was a completely separate issue. My primary concern, however, still was the decreasing temperature inside the cockpit. The PCL did not point to any type of environmental-control system (ECS) loss with this particular failure; although, failure of the bleed-air system does occur with the loss of both generators.

The cabin remained pressurized, and I had good

oxygen flow to the mask, but I decided to pull the emergency-oxygen green ring, just in case. Then I set an emergency squawk of 7700, via the backup IFF control, in an effort to get the ship's attention and to have a wingman join on me.

Still unsure of exactly what I was dealing with, I continued to thumb through the PCL to make a more accurate diagnosis. I rapidly was approaching an extremis situation and needed to do something quickly to warm the cockpit. I already had completed the emergency procedure for a failed right generator, which consisted of resetting the generator switch. This procedure did nothing to change the current situation. The only other option that came to mind was to cycle a guarded switch labeled Gen Tie, which essentially would override the fault-protection logic in the system and allow the good generator to pick up the load of the failed one.

With some reluctance, I moved the Gen-Tie switch to the RESET position. I hesitated because this switch overrides all fault-protection logic and ties the generators

directly. Initially, nothing happened, but, when I again tried to reset the generator, this time with the Gen Tie switch in the RESET position, power was restored to all systems. When I selected a radio frequency and tried to send out an emergency transmission to the boat, though, system power again was lost. As I stopped to ponder what just had happened, I looked outside the cockpit and realized no one had joined; I decided to try one last generator reset. All power and all systems again were restored. In the following minutes, as warm air once again began to flow from the ECS system, feeling began to come back in my numb hands.

For the moment, I felt relieved. My first priority was to establish radio contact with a squadron rep, who I was sure was standing by after my emergency squawk popped up on the carrier's air-traffic-control scope. My suspicions were confirmed when I heard a guard call with my aircraft's side number. I changed my squawk back to normal and soon was having a conversation with my commanding officer about what just had occurred. He slowly stepped me through the remaining NATOPS procedures. Neither of us could determine why my aircraft had lost all pitot-static and air-data-computer information, so he had me do an additional on-speed AOA check. At this point, everything in the cockpit had returned to normal, and I headed back to the boat for a low-visibility, high-wind, Case III approach. I made an uneventful arrestment.

If any non-Hornet aviators still are reading this article, I'll move on to some lessons learned, ones that I believe can apply to any platform. First and foremost is that NATOPS is printed for a reason. When faced with an emergency, pilots must be disciplined enough to read all applicable items in NATOPS. In my situation, I treated the right generator failure as more important than the Gen-Tie caution. I now know this mistake could have had grave consequences. By disregarding step one of the Gen-Tie procedure, the one that instructs the pilot to leave the Gen-Tie switch in the NORM position, I inadvertently could have cut off all electrical power to the aircraft and had to eject.

The NATOPS manual clearly states, "If the left and right buses are isolated because of a detected fault, cycling the Gen-Tie control switch reenergizes the faulty bus/equipment and may cause further damage or loss of the remaining generator." Because the FA-18's batteries are only operable for about 20

minutes, provided they have a full charge, I could have shorted out the left generator and subsequently had a total electrical failure. If that had happened, as those 20 minutes of battery power expired, the aircraft's flight controls would have become barely useful, and all electrical equipment would have been lost. With my aircraft above a solid cloud deck, having no nav aids, no communications, no wingman, and a marginally controllable airplane, I easily could have found myself in an ejection scenario.

This situation should reinforce how important it is to dust off the big NATOPS book from time to time. Knowing the boldface is important, and just reviewing the PCL every week before an immediate-action exam isn't always sufficient. Not being familiar with the subtleties of all aircraft systems could have disastrous consequences. As it turns out, the cold cockpit actually was a malfunction associated with this emergency, but was listed only in the big NATOPS manual. Had I known this information, I would have been much better equipped to solve the problem and less likely to have taken action outside of NATOPS's guidance. Also, we should not assume that the PCL will tell us everything we need to know regarding system failures when we are airborne.

Perhaps one of the biggest take-aways from this incident comes from something we were all told many times throughout flight school: "No fast hands in the cockpit." The salty old simulator instructors always told us the first thing a pilot should do when faced with an emergency is "punch the clock." Time is more than likely the one thing we do have on our side.

When looking back at what had happened, I am reminded of the importance of thoroughly preparing for all aspects and contingencies of a flight, emphasizing not only the tactical portions but the administrative side, too. Proficient carrier aviators often barely touch on possible emergencies during their flight briefs because they are focused mainly on getting bombs on target and shooting down bad guys.

Instead of simply briefing the standard NORDO procedures, I suggest a discussion on the finer points of being NORDO, alone, in bad weather, while flying on the standby instruments. This training might be more valuable and could prevent a mishap. I now place extra emphasis on in-flight emergencies because mental preparation for such events is just as essential a piece of flight gear as a helmet, pubs and nav bag. 🦅

Ltjg. Lyon flies with VFA-34.